FINANCIAL DEVELOPMENT AND ECONOMIC GROWTH: EVIDENCE FROM PANEL DATA

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ABSTRACT

This study explores the importance of financial development towards economic growth. This study examines the relationship between financial development and economic growth in OECD countries. Real GDP per capita is used to measure economic growth. To measure financial development three different variable is chosen namely liquid liabilities (M2), credit to private sector and Financial Technology (Fintech). Besides that, there are also few other variables that had been used a control variable which is Energy Consumption, Capital Formation and Net Trade. Panel Ordinary Least Square and Granger Causality had been employed to determine the relationship between the financial development and economic growth. Based on the result, we can conclude that financial development significantly impacts the economic growth of a country. However, from the empirical result the credit provided to private sector and Fintech have negatively impacted the economic growth. Despite, liquid liabilities has a positive relationship between economic growth. Besides that, from the result the capital formation and net trade had a positive relationship toward economic growth. Furthermore, the energy consumption has a negative impact on economic growth. From the empirical result we can conclude that there is a bidirectional causality flow between credit to private sector and GDP. besides that, GDP has a Uni-directional relationship flow from GDP to Liquid liabilities and Fintech. In general, a well-developed financial system is an essential element in boosting economy.

Keywords: Financial development, Economic Growth, Fintech, POLS, Granger Causality, OECD

ABSTRAK

Kajian ini mengkaji hubungan antara pembangunan kewangan dan pertumbuhan ekonomi di negara-negara OECD. Keluaran dalam Negara kasar (KDNK) sebenar per kapita digunakan untuk mengukur pertumbuhan ekonomi. Untuk mengukur pembangunan kewangan tiga pembolehubah berbeza dipilih iaitu liabiliti cair (M2), kredit kepada sektor swasta dan teknologi kewangan. Di samping itu, terdapat beberapa pembolehubah lain yang telah digunakan sebagai pemboleh ubah kawalan iaitu Tenaga, Pembentukan Modal dan Perdagangan Bersih. Panel Biasa Kuasa Dua telah digunakan untuk menentukan hubungan antara pembangunan kewangan dan pertumbuhan ekonomi. Hasil kajian menyatakan bahawa bahawa pembangunan kewangan memberi impak kepada pertumbuhan ekonomi sebuah negara. Walau bagaimanapun, dari hasil kredit yang diberikan kepada sektor swasta dan Fintech menunjukkan kesan negatif kepada pertumbuhan ekonomi. Manakala, liabiliti cair mempunyai hubungan positif dengan pertumbuhan ekonomi. Di samping itu, hasil daripada pembentukan modal dan perdagangan bersih mempunyai hubungan positif ke arah pertumbuhan ekonomi. Dari hasilnya, penggunaan tenaga mempunyai kesan negatif terhadap pertumbuhan ekonomi. Selain itu, ujian Causality Granger juga digunakan untuk menentukan kepuasan aliran kausal antara pembolehubah. Hasil kajian mendapati bahawa terdapat aliran kaitan dua hala antara kredit kepada sektor swasta dan KDNK dan KDNK mempunyai aliran hubungan Uni-arah dari KDNK kepada liabiliti Cair dan Pertumbuhan Ekonomi. Secara umum, sistem kewangan yang maju adalah elemen penting dalam meningkatkan ekonomi.

Kata kunci: Pembangunan kewangan, Pertumbuhan Ekonomi, Teknologi Kewangan, POLS, Causality Ganger, OECD

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LIST OF ABBREVIATION

GDP = Gross Domestic Product

POLS = Panel Ordinary Least Square

M2 = Ratio of money supply

EC = Energy Consumption

CF = Capital Formation

TRD = Trade Openness

Fintech = Financial Technology

ARDL = Autoregressive Least Square

OECD = Organization for Economic Co-operation and Development

SAARC = South-Asian Association for Regional Corporation Countries

PDOLS = Panel dynamic ordinary last square

FMOLS = Fully modified ordinary least square

PLS = Partial Least Squares

TAM = Technology Acceptance Model

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND OF STUDY

Financial Development can be defined as development of financial sector's efficiency in enhancing the selection of financial products and services, besides expending the regulation and financial stability of a country. Financial market of a country can enhances an efficiency in flow of saving and investment in economy. The main role of financial system to channelling fund from surplus unit to deficit unit. This would eventually help in to facilitate the accumulation of capital and production of goods services. As we observe many developed counties have a complex financial market development. According to Kindleberger (1978) a complex financial structure may lead to a financial crisis. A county can use financial system to raise fund for lending which helps the business, industries and government to generate income which eventually lead to increase in employment rate and income which will boost the economy. Therefore, a well-developed financial system is an essential element in boosting economy.

Examining the importance of financial development in an economy has been widely done by many researchers. Initially, Joseph Schumpeter has argued that development brought by financial intermediaries leads to technological innovation and economic growth in 1911.This led to an extensive research by many authors. For instance, Golsmith (1969) have stated that a standard growth in economy with the

presence of financial sector development. Besides that, Masani (1975) stated that Shaw (1973) have same view where by financial development enhance economic growth in his writing.

As we observe, most of the studies implies that finance is a component of economic growth which is explained by the supply leading hypothesis which also known as "finance-led growth hypothesis". According to this theory financial development is a deciding reason for economic growth. Based on supply leading hypothesis financial sector development will act as a catalytic agent in influential economic growth (Levine & King, 1993; Murinde & Eng, 1994; Odhiambo, 2007).

1.2 OVERVIEW OF STUDY

According to the sources from world bank, the worldwide GDP worth US$ 80.684 trillion. The figure 1.1 shows that the overall GDP in US dollar. According the figure below, there is an increasing trend of economic growth globally. In 2017, United States holds the highest GDP in the world roughly 25 per cent of the gross world product and followed by China and Japan. Based on the International Monetary Fund (IMF), it is expected that the global growth will increase 3.9 per cent by 2019 in the world economic outlook.

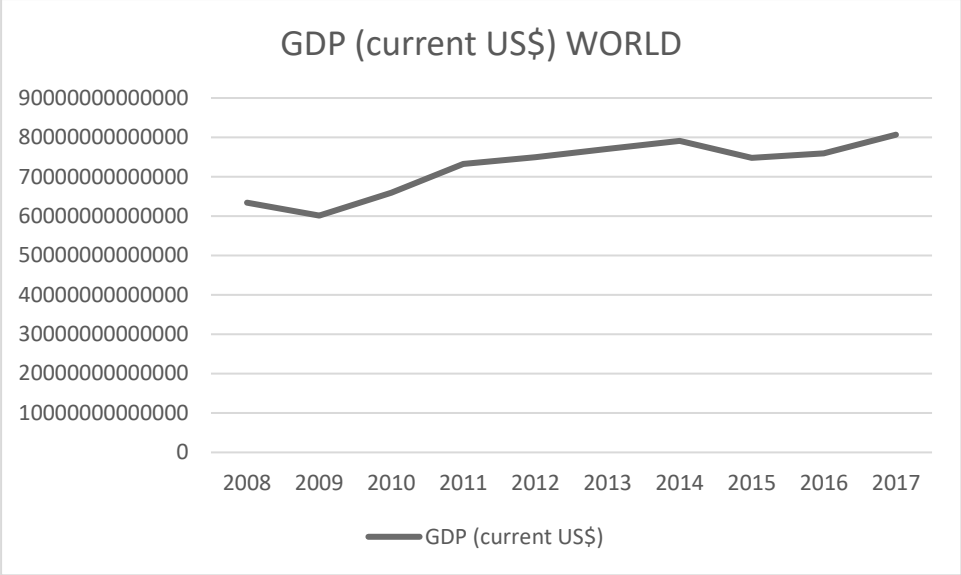

Figure 1.1 - *Statistics of global GDP in US dollar*
Sources: World Bank data, 2018 (http://databank.worldbank.org)

It is said that even the global economic has managed to remain a steady growth. However, Angel Gurría, the general secretary of OECD said that the implementation of new tariffs had impacted some the economy and the global investment is also diminishing in the launch of OECD economic outlook. Below are statistics of few countries that expected to slowdown in economy by year 2020.

Table 1.1
Real GDP revised down, Year- on -year (%)

COUNTRY	2018	2019	2020
G-20	3.8	3.7	3.7
GERMANY	1.6	1.6	1.4
FRANCE	1.6	1.6	1.5
ITALY	1.0	0.9	0.9
JAPAN	0.9	1.0	0.7
UNITED STATES	2.9	2.7	2.1
CHINA	6.6	6.3	6.0
INDIA	7.5	7.3	7.4
INDONESIA	5.2	5.2	5.1
RUSSIA	1.6	1.5	1.8
SOUTH AFRICA	0.7	1.7	1.8

(Sources: OECD Economic Outlook, 2018 : http://www.oecd.org)

1.3 PROBLEM STATEMENT

Growth of a country does not solely depend on its production level. Besides an economy can be boost by its foreign direct investment, trade openness, exchange rate, Inflation rate and more. As we observe closely the underlying mechanism of each activity in relate to financial system. Therefore, financial sector development might be a determinant that enhance economic growth of a country. However, when the question that does Financial development effect economic growth of a country appear, it is difficult to identify which aspect of financial development influence the economy?

As we breakdown financial development the element that defines financial segment of a country is the size or the magnitude of financial sector that extend which is also known as "Financial Depth". This is because there will be a question rise whether a greater size of a financial intermediary is able to pull up large financial activity can contribute to economic growth

Besides that, another aspect that contribute to financial system growth is the asset distribution of a financial intermediary. As we know financial intermediaries such banks provide funds to start up small business which lead the small business to contribute to the production on an economy. However, the problem rise is where the fund distribution by the financial intermediaries directly impact the growth of an economy.

Financial sector innovation is an important element in measuring financial development in this this globalization era. This is because the presence of technology increases the financial activity of a county. Despite new financial innovation there are many financial technology (Fintech) enhance the operation of financial sector such Automated Teller Machine (ATM) and internet banking.

Therefore, the main purpose of this investigation is to discover the element of financial development which impacts economic expansion of a country. This is due to the broad range of financial development variables cannot be only tested with only one aspect or variables.

1.4 RESEARCH QUESTION

In finding the relationship between financial development and economic growth, a few question upsurges as below:

1. Does financial liquidity impact economic growth?
2. Does credit provided to private sector enhance economic of a country?
3. Does Fintech contribute to the economic growth?

1.5 OBJECTIVE OF THE STUDY

Based on the research question above, the following research questions are raised:

1. To investigate the relationship of financial liquidity and economic growth
2. To investigate the connection between credit provided to private sector and economic growth of a country
3. To examine the contribution of Fintech on economic growth.

1.6 SCOPE OF STUDY

The main idea of this study is to identify the relationship shared by financial development and economic growth. This research paper emphasis on the casual relationship between financial sector development and economic growth for 24 OECD counties which cover the period from 2003 to 2015.Thus, Panel Data method will be employed in this study specifically on OECD counties

In 1961, The Organization for Economic Co-operation and Development (OECD) was set up with a current membership of 36 counties. The main purpose in establishing OECD was to endorse strategies which will help to enhance economy of OECD. Besides that, the association also works in to improve community welfare by sharing their understanding and search resolution for some mutual complication.

1.7 LIMITATION

While conducting this study, there are several constraints. The main restriction faced during this research is lack of data availability. Initially, to evaluate the financial development of OECD counties all was selected. However, due to constraint of data available few countries such Australia, Belgium, Israel, Iceland, Korea and few more counties have been dropped. This is because to avoid the inconsistency of data. Besides that, there are some years of data had to be deleted. There were bits and pieces of data missing from year 2016 to 2018.Therefore, 2016 to 2018 data had to be deleted. However, a large sample of data managed to be collected in order to get a precise result.

1.8 SIGNIFICANT OF STUDY

The investigation of determining the relationship between financial development and economic growth is important for a country to ensure to take a safe step in planning future development which helping to boost the economy. For example, if credit provided to private sector is proved to boost the economy of a country, then a country can amend its policy of credit giving to increase businesses in the country which will eventually help in increasing the production level and reduce unemployment rate of the county. Besides that, it is important for a country's financial sector to be enhanced and financial policy of to be regulated to avoid financial crisis that would impact the economy negatively. Therefore, it is important for a county not to avoid financial sector as it could lead to a significant problem if mislead.

1.9 CONCLUDING REMARKS

In short, this chapter describes the background of financial development to economic growth which includes the overview of worldwide GDP growth. This study has discussed the issue that involves in financial development and economic growth in problem statement and come out with three research questions and objective. Besides that, this chapter have included the significance and limitation of this study.

1.10 ORGANIZATION OF STUDY

This research paper is divided into five dissimilar chapters and organized from chapter one to chapter 5. Whereby chapter one explains the introduction of the study, background of the study, problem statement, research question, objective of the study, scope of the study, limitation of study and significance of the study. Followed by chapter 2 which contains the theoretical and empirical research that researchers have done previously. Chapter 3 contains the method description that used to investigate. Chapter 4 contains interpretation of result and Chapter 5 is the conclusion of the study

CHAPTER TWO

REVIEW OF THE RELATED LITERATURE

2.1 INTRODUCTION

This chapter summarizes the literature regarding relationship between financial development and economic growth. This chapter is divided into few segments. Firstly, chapter discuss about the literature regarding the theory that involve financial development and economic growth. The next chapter follows to discuss about the prior empirical research on financial development and economic growth. This chapter is divided into three sections which discuss the literature between Financial depth and economic growth, credit supply and economic growth and Fintech and economic growth.

2.2 REVIEW OF THE RELATED THEORY

Literature on investigation the relation of financial development and economic growth has gain importance in recent times. However, Joseph Schumpeter (1911) has argued that development brought by financial intermediaries leads to technological innovation and economic growth in (Levine & King, 1993). Later, Masani (1975) stated that Shaw (1973) have same opinion where by financial development do enhance economic growth in his strong writing and followed by McKinnon (1974) also have contributed to the same view significantly.

The subject of investigating the relationship between financial development and economic growth has gain popularity in recent years. Despite that, this research triggered a question where which should be pursued first which means among the financial development sector and economic growth sector rise a question where which

sector should lead and lag? (Odhiambo, 2007).This lead the theory has three different views. Firstly, financial development lead the economic growth which is known as supply leading hypothesis (Levine & King, 1993; Murinde & Eng, 1994; Odhiambo, 2007). Demand leading hypothesis suggest that economic growth led fiancial development (Adeyeye *el al* ,2015 ; Best & Francis, 2015). Lastly, Calderon & Liu (2003) has supported that both demand leading and supply leading hypotesis has casual relationship, which means there is a casual relationship exsist from fiancial development to economic growth and vice versa.

2.3 FINANCIAL DEVELOPMENT

In recent times, many researchers have used various proxy to test the relationship of financial development and economic growth. This is due to the wide range of measurement available for financial development in a country such measuring financial dept of a county, financial intermediaries' growth and financial innovation.

Sehrawat and Giri (2015) have tested the financial development's influence on five South-Asian Association for Regional Corporation Countries (SAARC). A set of data from year 1994 till 2013 was taken for Bangladesh, Pakistan, India and Sri Lanka. Panel dynamic ordinary last square (PDOLS) and fully modified ordinary least square (FMOLS) technique was used to test the co-integration. A financial development index was created using the Market capitalization of listed companies, domestic credit to private sector and broad money to measure financial development. PDOLS and FMOLS test indicates that financial development index has been associated positively with economic growth. Moreover, The Panel Causality test have indicated that financial development index effects economic growth while financial develop index also positively contribute to trade openness of SAARC region.

Arestis *et al* (2010) used a set of time series data to analyse the relationship between financial development and economic growth on a sample of six low- and middle-income countries which is Greece, India, Taiwan, South Korea, South Africa and Philippines. Different time frame is used to obtain data due to inconsistency of data availability where the period for Greece is from 1962 till 2000, India from 1966 till 1999, Taiwan1965 till 2000, South Korea from 1970 till 1999, South Africa from 1965 till 1999 and Philippines 1969 till 1999. Total value of domestic equities which listed in domestic stock exchange to total lending by deposit ratio is used as a proxy for financial structure which is like the measure of financial structure size. Under Johansen (1988) Maximum Likelihood approach cointegration test was carried out and FMOLS technique was also employed. The authors concluded that financial structure explains the productivity for most of the country significantly (5 out of 6).

Masoud and Hardaker (2012) done an empirical analysis on emerging market to find the influence of financial sector growth on economic development. A data set of 42 countries from year 1995 to 2006 were used in the empirical findings. Banking sector growth indicators and Equity market development variables is used as a proxy for Financial Development. The result suggests stock market development variable have significantly affect the GDP and have a positive correlation with GPD which means stock market development plays an important role in boosting emerging market economy. Besides that, the findings show the banking sector development have positively correlated and significant at the level of 0.01. However, the author had concluded that generally banking sector growth and equity market development enhance the economy.

2.4 LIQUID LIABILITIES AND ECONOMIC GROWTH

In the study of King and Levine (1993), they constructed four indicators to represent financial development which was the growth of financial intermediaries in size comparative to economic activity due to measure the Financial depth, institutional disintegration between central bank and deposit money bank, percentage of credit channelled to private entity by financial intermediaries and the claims on the nonfinancial private sector to economy ratio which is to measure the distribution of domestic asset. These variables were tested for 80 countries from year 1960-1985. In their research they have concluded that Schumpeter might be right by mentioning importance of financial development to enhance economy.

Klein and Olivei (2008) have studied the significance of effect of open capital accounts on financial depth and economic growth in developed and developing countries. liquid liabilities indicator has used to represent the ratio of liquid liabilities to GDP where by it measures the financial depth. A set of data of 21 OECD counties and 74 non-OECD countries was collected a period of 1986 to 1995.Ordinary least square model of regression have been used in the investigation. Based on the result the authors concluded that that capital account liberalization might not have the same impact to all countries. To be more pricise, the positive relationship between capital account liberalization and financial depth seems to be concentrated among countries that were members of the OECD in 1986. However, there is little evidence of capital account liberalization promoting financial depth for non-OECD counties.

Asteriou and Spanos (2018) have recently carried out investigation on relationship between Financial Development and Economic Growth during the sub-prime financial crisis on 26 European Union counties from year 1990 to 2016.Using various panel regression the authors found a significant relationship of commercial bank asset and market capitalization on economic growth while the liquid liabilities and stock market turnover ratio were insignificant during the test involved whole period of study. However, during the pre-ongoing period of the crisis the authors found that stock market also effects the economic while liquid liabilities as still insignificant. During the crisis period the result indicated that all the financial development indicators used in the investigation had positively affected the economic growth except for stock turnover ratio. Lastly, the authors also carried out test without the subprime crisis period where the result was the same with the pre-ongoing crisis period where the result supported that financial development impact the economy during crisis period excluded.

2.5 CREDIT SUPPLY AND ECONOMIC GROWTH

Durusu-Ciftci & Yetkiner (2015) have investigated the relation of Financial Development on economic growth theoretically and empirically. In the investigation a panel data of selected 40 countries from year 1989-2011. They have used domestic the ratio of credit to private sector by GDP to measure credit market development and the total value traded of domestic shares in a stock market exchange to GDP ratio has been collected to measure stock market development which is used as a proxy for financial development. Two panel unit root test was carried out because the first-generation panel unit root test failed due to null hypothesis was rejected as there was no cross-sectional dependence. The authors found out that both credit market indicator and stock market indicators have positively affect the economic growth. However, the result strengthens

the view that credit market indicators have a strong have strong impact on economic growth comparatively to stock market development.

Afonso and Blanco-Arana (2018) have studied the influence of financial development and economic growth in terms of financial crisis. Data for 30 OECD countries was collected from year 1990 to 2016. The data was tested using Pooled OLS technique as they introduce the presence of crisis through dummy variable covering from year 2008 till 2011. Domestic credit provided by the financial intermediaries, turnover ratio of domestic share and market capitalization of listed domestic companies is used to represent financial development. The result suggest that all financial development variable positively impact the economic growth of 30 OECD countries. However, the result suggest that domestic credit provided to private sector by financial intermediaries have a greater impact on economic expansion compared to other financial development variable. Besides that, the test on crisis period using dummy variable does not affect the economic growth.

Besides that, Madsen *et al* (2018) have also found that disparity have affect the economy of a county negatively especially to the underdeveloped countries. This is due to their low-income level which unable to channel credit amenities in low incomed economies. Besides that the authors stressed that credit market restriction have greater impact on poor countries compared to higher income countries. The authors employed the Autoregressive Distributed Lag (ARDL) method to find out that inequity has a little effect on highly developed countries with limited credit allocation.

Siddique *el at* (2018) have investigated the relationship between financial development and economic growth with the corporation of energy consumption in Pakistan. In this study domestic credit to private sector had been used to measure financial development, per capita GDP at a constant price based in 2010 was used as a proxy for economic growth and energy used per capita (kg of equivalent to oil). The author has used Johansen co-integration and granger causality approach to test the investigation empirically. A set of data collected from year 1980 to 2016 for the empirical test. Based on the result the author concluded that there is a unidirectional causality found from energy and financial development and capital formation and exports to use of energy.

2.6 FINTECH AND ECONOMIC GROWTH

There is less empirical study on Fintech, especially relating Fintech and economic growth. However, there are few authors have done their study on Fintech which is relatable to our study. For example, Nyasha and Odhiambo (2015) have used Market based financial development indicators and bank based financial development indicators as a representative for financial development against economic growth. The research results that there is a causality flow in a direction from Financial Development to Economic Growth which support the supply leading hypothesis. However, the result differs for each country due to the country's specific character, set of data and the empirical method used.

Ryu (2018) have instigated why consumers are keen to use Fintech where they have both positive and negative impact. The author proposed a benefit-risk framework which includes the association of both positive and negative impact. The benefit that has been included in the framework was economic impact, handiness and transaction process while financial, lawful, safekeeping and operational had been classify as risk. By

adopting Partial Least Squares (PLS) method the authors found that the handiness of Fintech usage has been the largest advantage whereas legal risk was identified as the main disadvantage.

Li *et al* (2017) found the impact of Fintech funding on retail bank's share prices. This research covers data from 47 current US retail banks for 2010 to 2016.In order to extract the importance of Fintech funding, both numbers of agreements and the dollar-volume data was used in the research. Panel Ordinary least Square (POLS) method was employed in order to standardize standardized Fintech funding volume and Fintech number of agreements growth rate. The authors concluded that there is a significant relationship exists between Fintech and the stock return of these banks positively

Stewart and Jürjens (2018) have investigated the reasons that influence the financial technology adaptation in Germany. The authors employed Technology Acceptance Model (TAM) to analyse reasons that influence the financial technology adaptation in Germany empirically. However, they found that even though number of mobile phone subscribers in Germany are quickly increasing yet the acceptance of Fintech is extremely sluggish. The authors found that 99 per cent of respondents are mobile phone subscriber, however only 10 percent only are aware of Financial Technology. Besides that, it is interesting to know from the survey among 209 respondents, only 10 respondents have experienced in using Fintech from their mobile phone.

2.7 CONCLUDING REMARKS

This chapter summarize the literature review on financial development and economic growth. This also include the theoretical review in explaining the relationship between financial development and economic growth used in this study. Among the three suggested theory the supply leading hypothesis is employed in this study. Besides that, in literature review this chapter also found the difference in opinion on financial development of some researchers.

CHAPTER THREE

DATA AND EMPIRICAL METHOD

3.1 INTRODUCTION

This chapter discuss about the method to investigate empirically the relation between the financial development of a country towards its economic growth. There are few sections in this chapter which consist of data description, research framework, hypothesis construction, analysis of the method used and conclusion which consist of six section all together.

3.2 THEORY TO BE EMPLOYED

The theory that has been employed in determining the relationship of Financial development and Economic growth is the "Financial led Theory" which is also known as supply leading hypothesis (Levine & King, 1993; Murinde & Eng, 1994; Odhiambo, 2007). According to this theory an efficient financial sector that able to allocate the resoures efficiently will be able to increase the production level, employment rate and repid growth of technology. (Acaravci, Ozturk, & Acaravci, 2009)

3.3 DATA DESCRIPTIONS

This research comprises paned data for selected 24 OECD countries which are listed in Appendix 1. However, few countries such Belgium, Israel, Slovenia and more has beed droped due to insuffient data.

The panel data are retrieved from the year 2003 to 2015 as some of the data for the countries selected are unavailable. Variables included Gross Domestic Products (GDP), Capital Formation, Energy Consumption, Trade and Financial Development. Again, the

items in the variables are selected based on the availability of data and as per relevance in the OECD countries. The details of these data are provided in Table 3.1.

Table 3.1
Data Description

No	Variables	Proxy/Data	Description	Abbreviation	Source
1	Economic Growth	Real Gross Domestic Product Per capita	Real GDP Per capita is an amount of the total production output of a county divided by the population of the county which is adjusted with inflation	GDP	Thomson Reuters DataStream
2	Financial Development	Liquid Liabilities	Ratio of Money Supply (M2) and GDP	FD1	
3		Credit Allocation	Bank lending to private sector	FD2	
4		Fintech	Mobile Phone Subscriber (per 100 people)	FD3	World Bank Indicators
5	Capital Formation	Capital Formation	Gross capital formation (current US$)	CF	
6	Energy Consumption	Energy Consumption	Energy use (kg of oil equivalent per capita)	EC	
7	Trade Openness	Ratio of total trade	Exports of goods and services (% of GDP)	TRD	

3.3 GROWTH VARIABLES

The economic growth variable is measure by per capita real GDP base year of 2010 (Odhiambo, 2009; Sehrawat and Giri, 2015; Ouyang and Li, 2018). GDP Per Capita is obtained by totalling the production level of the county divided by the total population which makes an ideal variable to compare different countries as it shows the comparative performance. Moreover, any changes in per capita GPD indicates the changes in economy which will also reflect in productivity of a country.

3.3 FINANCIAL DEVELOPMENT VARIABLES

MONEY SUPPLY (M2)

Money Supply is commonly used to represent financial development as it measures the financial depth of a country. Some author uses M3 as a proxy in determining financial development. This is due to its broader aggregate which captures the financial development better that M2. However, King and Levine (1993) define financial development as the ratio of liquid liabilities to GDP Per Capita. Moreover, few authors have also used M2 which is narrow money to measure financial development for example Shamim (2007), Odhiambo (2008), Ouyang and Li (2018) and Asteriou and Spanos (2018).

CREDIT ALLOCATED TO PRIVATE SECTOR

Domestic credit allocated to private sector can be define as the funds provided to the private institution by financial institution in the form of loan and securities. King and Levine (1993) mention that credit to private sector used as a proxy for computation of funds provided to government. This is because government sector projects have no evaluation by managers. These variables have been supported by few other authors such Ciftci *et al* (2015), Afonso and Blanco-Arana (2018) and Madsen *et al* (2018).

FINTECH

Due to lack of availability of data of a direct proxy for financial technology, this study focusses on factor which penetrates the availability of financial technology to consumers. The increasing trend in mobile phone subscribers has been encouraging the usage of e-finance or internet banking (Shamim, 2007). According to the studies done by Christiansen (2001) on English speaking counties in north region, there are large dissimilarity of internet access of countries. However, the study claims that internet dispersion has a positive relationship towards internet banking. Besides that, e-finance growth rate in a country depend on its strong telecommunication network (Raihan, 2001) As we notice the way that albeit new instrument in payment method emerged have been seen before the boundless selection of the internet. Therefore, we can conclude that Fintech as new instrument to represent the financial development in financial market and institution.

3.4 CONTROL VARIABLES

There are three control variables have been used in this study namely energy consumption, capital formation and trade openness.

ENERGY CONSUMPTION

In recent times, energy has been gaining a great demand in many counties as it is a non-renewable resource. Energy consumption contributing to economy since the demand for energy have direct impact on counties' share of global energy consumption (Rafiq & Salim, 2011).Some studies shows that energy consumption has strong relationship with economy.(Al-IrianI, 2005) Energy use (kilogram of oil equivalent per capita) have been used to measure energy consumption in this study.

CAPITAL FORMATION

Capital formation can be defined as the investment of an economy which consist of outlays on additions to the fixed assets of the economy and net changes in the level of inventories. Capital flow is a variable used to investigate effect on economic growth (Chow, 1993).Gross capital formation in dollar has been used to measure capital formation in this study.

TRADE OPENNESS

Huchet-Bourdon *et al* (2018) mention that trade openness cannot be fully characterised through the trade ratio only. However, we have used net export to measure trade openness. Trade openness have a casual relationship with economic growth (Hossain, 2011)

3.5 THEORETICAL FRAMEWORK

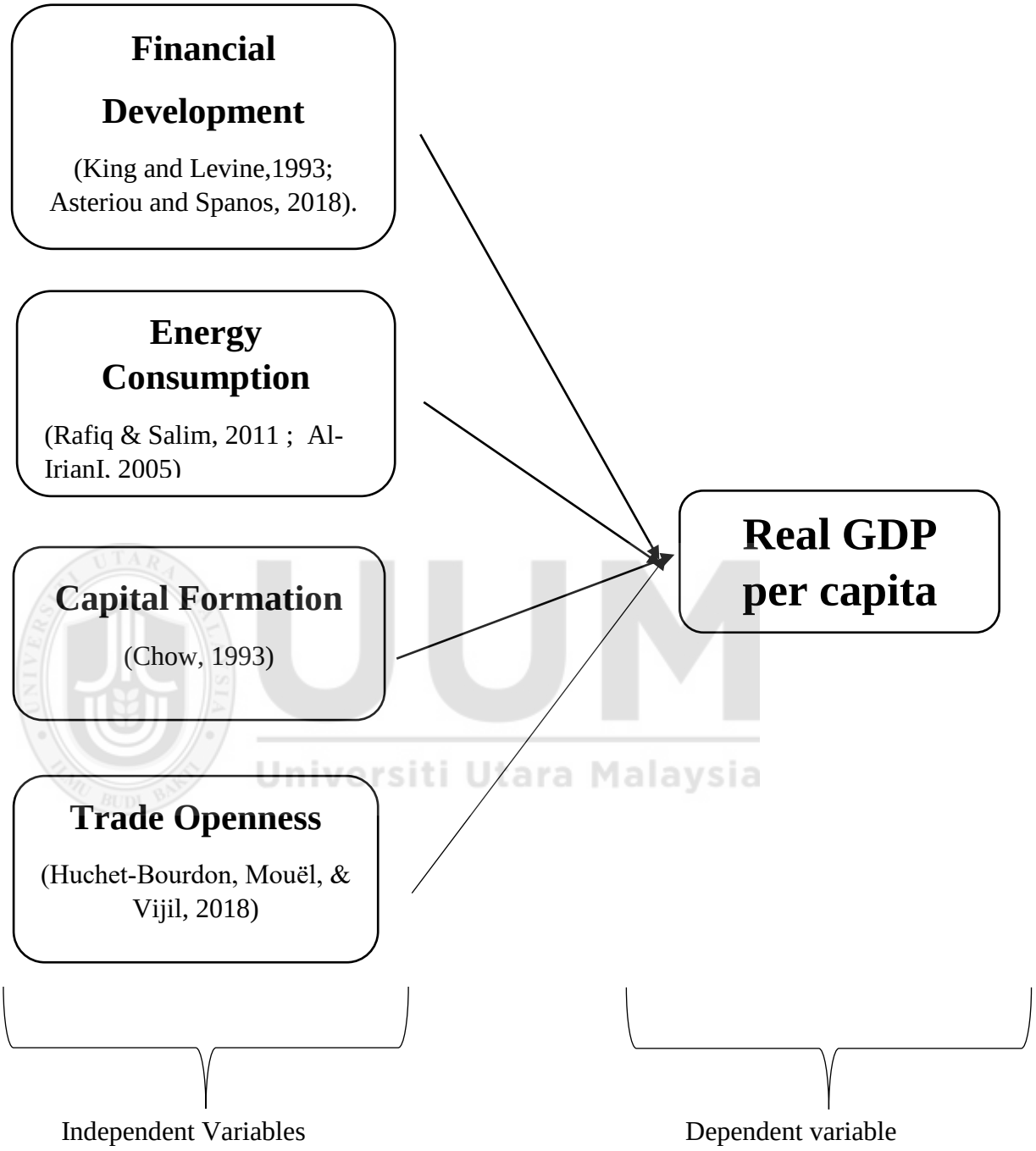

Figure 3.1- *Theoretical framework*

3.6 RESEARCH HYPOTHESIS

Based on the supply leading hypothesis we develop the following hypothesis:

H_{0A} = Financial development does not have significant relationship with GDP.

H_{1A} = Financial development has significant relationship with GDP.

H_{0B} = Energy consumption do not have significant relationship with GDP.

H_{1B} = Energy consumption have significant relationship with GDP.

H_{0C} = Trade Openness do not have significant relationship with GDP.

H_{1C} = Trade Openness have significant relationship with GDP.

H_{0D} = Capital formation does not have significant relationship with GDP.

H_{1D} = Capital formation have significant relationship with GDP.

From regression model, it can be expressed as:

$$Y_{it} = \alpha + \beta X_{it} + \cdots + \mu_{it}$$

Y = Dependent variable

X = Independent variable

α and β = coefficients

i and t = Subject and Time

μit = error term

Therefore,

$$Y_{it} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 \ldots . + \mu_{it}$$

$$Y_{it} = \beta_0 + \beta_1 CF + \beta_2 EC + \beta_3 TRD + \beta_4 FD1 + \beta_4 FD2 + \beta_4 FD3 + \mu_{it}$$

3.7 EMPIRICAL METHOD

DESCRIPTIVE ANALYSIS

Descriptive analysis analyses the characteristics of a specific data set. The communal descriptive analysis tool is calculating the mean, median and mode of the data. Descriptive analysis also summarizes a data set quantitatively.

CORRELATION ANALYSIS

Correlation analysis is used to determine the relationship between two variables. The correlation analysis helps in determining the strength of relationship between the variables. The values of coefficient usually fall between -1 to +1. The stronger the relationship of the variable the greater the number of confident towards 1. The coefficient of 1 indicated the perfect correlation between the variables.

PANEL UNIT ROOT TESTS

The Panel data Unit root test is used to test the stationarity in panel datasets. There are three types of unit root test which is Levin, Lin and Chu (2002), Im, Pesaran and Shin (2003) and Fisher-type tests using PP tests. All these three types of test implies a null hypothesis that all the panels contain a unit root.

PANEL ORDINARY LEAST SQUARES (POLS) REGRESSION MODEL

This statistical method is used to find the relationship between dependent and independent variables in a linear regression model. The total square in the difference between the observed and estimated values of dependent variable is figured in a liner line to estimate the relationship. However there a few assumptions in undertaking this method. Below are the few assumptions of Ordinary least square:

1.The regression model has a linear parameter

2.The mean is conditionally zero

3.In OLS it is assumed that there is no multi-collinearity exist

4. The error term is normally distributed.

GRANGER CAUSALITY TEST.

This test is take to investigate a set of data is useful in projecting another. These test helps to estimate the flow of variable cause. In our investigation granger causality helps in determining the causality flow from financial development or economic growth.

$$GDP_t = \sum_{i=1}^{n} \alpha_i \, FD_{t-1} + \sum_{j=1}^{n} \beta_j \, GDP_{t-j} + \mu_{it}$$

$$FD_t = \sum_{i=1}^{n} \alpha_i \, GDP_{t-1} + \sum_{j=1}^{n} \beta_j \, FD_{t-j} + \mu_{it}$$

3.8 CONCLUDING REMARKS

This chapter summarize the techniques used in this study to find out the answers of the research question. The relationship of dependent and independent variable has been illustrated in the theoretical framework. The dependent variable in this study is GDP per capita and consist of four independent variable which is financial development, energy consumption, capital formation and trade openness. Besides that, this chapter also summarize the analysis that have been employed to conduct this study.

CHAPTER FOUR

EMPIRICAL FINDINGS

In this chapter we will be discussing the results the analysis of the study on Financial Development and Economic Growth. The following table shows the descriptive statistics which also followed by correlation analysis. We then discuss the empirical findings based on method of Panel Least Ordinary test and Granger Causality.

4.1 DESCRIPTIVE ANALYSIS

Table 4.1
Descriptive analysis Results

	GDP	FD1	FD2	FD3	CF	LEC	TRD
Mean	11.4214	12.3329	12.2955	4.64073	25.3981	8.18457	3.69756
Median	10.5799	12.8024	12.8263	4.69361	25.2830	8.19857	3.63183
Maximum	15.8892	22.6357	21.9320	5.14853	27.9712	9.15152	5.40584
Minimum	9.14745	3.40784	3.07731	3.34957	21.9671	7.07195	2.20138
Std. Dev.	1.79708	3.91127	3.76932	0.26943	1.38513	0.47161	0.61618
Skewness	1.07039	0.16652	0.07673	-1.25997	-0.26185	-0.01422	0.26644
Kurtosis	2.96448	3.97792	3.75734	5.79875	2.32317	2.54369	3.04504
Jarque-Bera	59.5956	13.8744	7.76256	184.380	9.52058	2.71726	3.71799
Probability	0.00000	0.00097	0.02062	0.00000	0.00856	0.25701	0.15582
Sum	3563.49	3847.89	3836.20	1447.91	7924.22	2553.58	1153.63
Sum Sq. Dev.	1004.382	4757.697	4418.636	22.57698	596.6822	69.17174	118.0805

As shown in the table 4.1, 312 number of observations had been used in the analysis. Comparatively, trade has the lowest mean which is 3.697 and followed by Mobile phone subscriber with the mean of 4.64. Besides that, capital formation has the highest mean which is 25.398 and followed by money supply with the mean of 12.332. GDP Per Capita which is the dependent variable has the mean and median of 11.421 and 10.579 respectively. Moreover, the standard deviation for GDP Per Capita is 1.79. Next, we look into our financial development variables where by money supply, credit and Mobile phone subscriber has a median of 12.802, 12.826 and 4.693 correspondingly. The standard deviation of money supply, credit and Mobile phone subscriber is 3.911, 3.769 and 0.269 individually. Among the control variable the capital formation has the highest standard deviation followed by trade and energy consumption which is 1.385, 0.616 and 0.471 respectively.

4.2 CORRELATION ANALYSIS

Table 4.2
Correlation matrix

	GDP	FD1	FD2	FD3	CF	LEC	TRD
GDP	1.000000						
FD1	-0.119292	1.000000					
FD2	-0.234098	0.798936	1.000000				
FD3	-0.070972	-0.32124	-0.22933	1.000000			
CF	-0.053603	0.454082	0.54291 5	-0.225951	1.000000		
LEC	-0.089449	-0.44868	-0.35456	0.159244	0.002157	1.000000	
TRD	0.095659	-0.44019	-0.32433	0.379939	-0.72117	0.182621	1.000000

As per table 4.2, the correlation between the dependent variables of this research of GDP per capita and other independent variable shows a negative correlation except for trade variable which shows a coefficient of 0.09. However, it shows a weak positive liner relationship compared to credit variable have slightly higher negative correlation. According to the table, money supply is highly correlated with credit. The table shows that credit has been positively strong correlation with money supply with the coefficient of 0.798. However, capital formation has a strong negative correlation with trade. Energy consumption has the highest correlation with money supply negatively by -0.448. Energy consumption have also positively correlated with capital formation. However, it is considered a weak correlation as the correlation coefficient is low which is 0.002.

4.3 PANEL UNIT ROOT TEST

Table 4.3
Panel Unit Root result

	Im, Pesaran and Shin W-stat		**Levin, Lin & Chu t**		**PP - Fisher Chi-square**	
	level	First Diffrence	level	First Diffrence	level	First Diffrence
GDP	-1.41133	-3.27575	-3.52162	-6.80924	68.9266	120.536
	0.0791*	0.0005***	0.0002***	0.0000***	0.0255	0.0000***
FD1	0.51744	-4.67633	-4.01669	-10.0491	101.709	108.965
	0.6976	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***
FD2	-4.08496	-4.56034	-9.06809	-7.39659	130.49	99.8129
	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***
FD3	-5.6623	-3.20285	-6.1710	-7.11699	264.318	106.512
	0.0000***	0.0007***	0.0000***	0.0000***	0.0000***	0.0000***
EC	4.58262	-8.57012	1.39927	-10.619	18.954	313.619
	1.0000	0.0000***	0.9191	0.0000***	0.9999	0.0000***
TRD	1.05632	-4.4299	-1.68692	-7.79189	57.9951	182.571
	0.8546	0.0000***	0.0458	0.0000***	0.153	0.0000***
CF	-2.90299	-4.03667	-5.2206	-8.2859	161.842	129.61
	0.0018***	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***

Notes: *, **, *** significant at 10%, 5% and 1% respectively

Table 4.3 reports the results of the Levin, Lin and Chu (2002), Im, Pesaran and Shin (2003) and Fisher-type tests using PP statistic for the dependent and independent variables in this study for levels and the first differences of the natural log values. Based on the result is Levin, Lin and Chu (2002), Im, Pesaran and Shin (2003) and Fisher-type tests using PP statistic showed that the dependent variable, GDP per capita is non-stationary. In this case Levin, Lin and Chu (2002), Im, Pesaran and Shin (2003) and Fisher-type tests using PP rejected the null hypothesis. Besides that all independent variables under consideration are non-stationary in their levels and become stationary when they are first differenced.

4.4 PANEL ORDINARY LEAST SQUARE

Table 4.4
Panel Least Square result

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	7.465064	3.777812	1.976029	0.0491**
FD1	0.083475	0.044354	1.882018	0.0608*
FD2	-0.309067	0.047838	-6.460655	0.0000***
FD3	-1.135766	0.382583	-2.968679	0.0032***
CF	0.643954	0.123142	5.229385	0.0000***
EC	-1.113992	0.237262	-4.695191	0.0000***
TRD	1.287370	0.257501	4.999473	0.0000***

R-squared	0.183938	Mean dependent var	11.42145
Adjusted R-squared	0.167884	S.D. dependent var	1.797087
S.E. of regression	1.639310	Akaike info criterion	3.848608
Sum squared resid	819.6377	Schwarz criterion	3.932586
Log likelihood	-593.3829	Hannan-Quinn criter.	3.882171
F-statistic	11.45768	Durbin-Watson stat	0.007146
Prob(F-statistic)	0.000000		

Notes: *, **, *** significant at 10%, 5% and 1% respectively, All the variables are in natural log.

$$Y_{it} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 \ldots . + \mu_{it}$$

$$Y_{it} = \beta_0 + \beta_1 CF + \beta_2 EC + \beta_3 TRD + \beta_4 FD1 + \beta_4 FD2 + \beta_4 FD3 + \mu_{it}$$

GDP = 7.46 + 0.64 CF- 1.11EC + 1.29 TRD + 0.08 FD1 – 0.31 FD2 – 1.14 FD2

Standard Error = (3.7778) (0.0478) (0.3825) (0.1231) (0.2372) (0.2575)

T-Stat = (1.9760) (1.8820) (-6.4606) (-2.9686) (5.2293) (-4.6951) (4.9994)

P value = (0.0491) (0.0608) (0.0000) (0.0032) (0.0000) (0.0000) (0.0000)

N = 312

$R^2 = 0.18$

Adjusted $R^2 = 0.17$

From table 4.3 the significance of each variable can be estimated using the degree of freedom which is computed by:

df = n-k-1

N= Number of Observation

K= Number of independent variables

Therefore, Degree of freedom is 312-6-1 = 305 resulting the value of t-statics is more than 1.96 for all variable which leads to a significance on 1% confidence level except for FD1 variable which is money supply have a confidence level of 10%.

4.4.1 RELATIONSHIP BETWEEN FINANCIAL DEVELOPMENT AND ECONOMIC GROWTH

According to table 4.3 the Panel Ordinary Least Square (POLS) shows that Financial Development has a significant relationship towards economic growth of 24 OECD countries. These include all three financial development variable that had been tested on 24 OECD counties. However, the level of significance of each variable differs. FD1 has a significance level of 10% while FD2 and FD3 is significant at level 1%.

The POLS test result indicates that FD1 has positive impact on economic growth. This is where 1% increase in financial development causes increase in economic growth by 0.08 % with the assumption of other variables remain constant. Hence at 10 % significance level, the null hypothesis which stated that financial development has no relationship with economic growth rejected. Therefore, financial development positively contributes economic growth of 24 OECD Countries from year 2003 till 2015. (King and Levine,1993; Shamim ,2007; Odhiambo,2008; Ouyang and Li ,2018; Asteriou and Spanos,2018)

However, there are two other financial development variables that has been tested on economic growth which is credit supply and Fintech. FD1 and FD2 have a significant relationship towards economic growth at significance level of 1%. Surprisingly the result indicated a negative significant relationship towards economic growth, where 1% increase in FD 2 which is credit supply causes economic growth decrease by 0.30 % with the assumption of other variables remain constant. Besides that, FD 3 which is Fintech indicates a 1% increase in leads to economic growth reduce by 1.14 % with the assumption of other variables remain constant. Based on the above table all three financial development variable is significant.

Therefore, the null hypothesis where financial development has no relationship with economic growth is rejected. Overall the results show the financial development variables effect the economy either positively or negatively.

4.5 GRANGER CAUSALITY RESULTS

Table 4.5
Granger Causality result

Null Hypothesis:	Obs	F-Statistic	Prob.
FD1 does not Granger Cause GDP	264	0.20148	0.8176
GDP does not Granger Cause FD1		10.2722	5.E-05***
FD2 does not Granger Cause GDP	264	3.32942	0.0374**
GDP does not Granger Cause FD2		11.6780	1.E-05***
FD3 does not Granger Cause GDP	264	2.22217	0.1104
GDP does not Granger Cause FD3		3.25245	0.0403**
CF does not Granger Cause GDP	264	17.2631	9.E-08***
GDP does not Granger Cause CF		12.7296	5.E-06***
LEC does not Granger Cause GDP	264	1.00070	0.3690
GDP does not Granger Cause LEC		1.45809	0.2346
TRD does not Granger Cause GDP	264	4.29857	0.0146**
GDP does not Granger Cause TRD		3.21769	0.0417**
FD2 does not Granger Cause FD1	264	2.23620	0.1089
FD1 does not Granger Cause FD2		8.33682	0.0003***
FD3 does not Granger Cause FD1	264	8.32161	0.0003***
FD1 does not Granger Cause FD3		3.61395	0.0283**
CF does not Granger Cause FD1	264	6.66521	0.0015***
FD1 does not Granger Cause CF		2.01735	0.1351
LEC does not Granger Cause FD1	264	6.48037	0.0018***
FD1 does not Granger Cause LEC		1.75138	0.1756
TRD does not Granger Cause FD1	264	2.48407	0.0854*
FD1 does not Granger Cause TRD		6.52153	0.0017***

Notes: *, **, *** significant at 10%, 5% and 1% respectively

The above table shows a pairwise Granger causality test to estimate the causal relationship among the variables.

4.5.1 BI-DIRECTIONAL CAUSALITY

Table 4.5.1
Bi-directional Causality

Variables	F-Stat	Prob
FD2 does Granger Cause GDP	3.32942	0.0374**
GDP does Granger Cause FD2	11.6780	1.E-05***
CF does Granger Cause GDP	17.2631	9.E-08***
GDP does Granger Cause CF	12.7296	5.E-06***
TRD does Granger Cause GDP	4.29857	0.0146**
GDP does Granger Cause TRD	3.21769	0.0417**
FD3 does Granger Cause FD1	8.32161	0.0003***
FD1 does Granger Cause FD3	3.61395	0.0283**
TRD does Granger Cause FD1	2.48407	0.0854*
FD1 does Granger Cause TRD	6.52153	0.0017***

Notes: *, **, *** significant at 10%, 5% and 1% respectively

Table above shows the bi-directional causality among the variable. According to the result we can conclude that there is a casual relationship flow from GDP to FD2 and vice versa which means the theory that indicated by Calderon & Liu (2003) the financial development or more specifically credit supply to leads the economic growth and the other way around.

4.5.2 UNI-DIRECTIONAL CAUSALITY

Table 4.5.2
Uni-directional Causality

Variable	F-stat	Prob
GDP does Granger Cause FD1	10.2722	5.E-05***
GDP does Granger Cause FD3	3.25245	0.0403**
FD1 does Granger Cause FD2	8.33682	0.0003***
CF does Granger Cause FD1	6.66521	0.0015***

Table above shows the bi-directional causality among the variable. According to the table, GDP has a Uni-directional relationship between FD1 and FD3 at a significance level of 1% and 5% respectively. This shows the causality relationship flow from economic growth to financial development (Adeyeye el al ,2015; Best & Francis, 2015). Furthermore, FD 1 has a unidirectional relationship with FD 2 and CF at a significance level of 1%.

4.6 CONCLUDING REMARKS

This chapter shows the result and the analysis of the findings. The analysis starts with the descriptive analysis where shows the mean, median, minimum value and maximum values. Then, followed by the correlation analysis which shows the relationship between two variables. Panel Ordinary Least Square result is the analysed which shows the relationship between dependent and independent variable. Lastly, this chapter contains Granger Causality analysis which determines the flow of causality of dependent and independent variable.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

5.1 INTRODUCTION

This chapter illustrates the overall study that have been taken. First section provides a full description of the summary of study which includes the result of the study. Secondly, this section follows with the recommendation of policy implementations and finally this chapter is concluded with recommendation of future studies.

5.2 SUMMARY OF STUDY

The key purpose of this study is to find the relationship between financial development and economic growth in selected OECD countries. In regards, investigating the financial development and economic growth three aspect of financial development variable have been used to measure financial development namely liquid liabilities, Credit to private sector and Fintech. Besides that, capital formation, energy consumption and net trade variables was also employed as control variables in this investigation. Set of data from year 2003 to 2015 for 23 OECD counties was selected to test the investigation empirically.

To empirically investigate the relationship between Financial Development and economic growth of OECD countries a descriptive analysis was taken to identify the characteristic of the data set. Secondly, correlation analysis has been done to determine the relationship of among the variable of interest. Panel Ordinary Least Square method

was used to regress the model and lastly, in order to identify the direction of causality, the Granger causality was applied in the study.

Based on the analysis, we can conclude that financial development significantly impacts the economic growth of a country. However, from the result the credit provided to private sector and Fintech have negatively impacted the economic growth. Despite, liquid liabilities has a positive relationship between economic growth. Besides that, from the result the capital formation and net trade had a positive relationship toward economic growth. Based on the empirical result, the energy consumption has a negative impact on economic growth.

On top of that, the granger causality test indicated that there is a conclude that there is a bi-directional relationship flow from GDP to liquid liabilities and vice versa which in line with Calderon & Liu (2003). From the granger test, GDP has a uni-directional relationship between Liquid liabilities and Fintech (Adeyeye el al ,2015; Best & Francis, 2015).

5.3 RECOMMENDATION OF POLICY IMPLEMENTATION

Government play an important role in grapping opportunities that can be used to develop economy. Besides focusing on production level, an equal amount on maintaining the macroeconomic environment and financial instituions. A safer environment needs to be created in order to encourage investment of outsiders which encourages new investment into the country. Incremental capital formation leads the economy to grow.

The government should also look into the policies that facilitate trade among nations. The tool that government have to facilitate and restrict trade in by imposing tariff. This is when the country wants to limit certain goods and product import to encourage production of goods in the county. An equilibrium maintenance in trace policies can enhance the growth of economy undoubtedly.

Lastly, a little attention on financial sector development is always necessary. This study might provide a little evidence to show the relationship of financial sector development on economic growth. However, finance have been an important element in maintain the economy. This is due to undeveloped or government that fail to monitor the financial sector might led to collision of financial system. Even when some countries do not involve in subprime financial crisis, but have experienced the impact of financial crash. Therefore, it is important to monitor the financial system to avoid miscellaneous problem.

5.4 RECOMMENDATION OF FUTURE RESEARCH

Based on the research done, there are still lots of space for improvement. In order to test the impact of Fintech, factor that enhance Fintech was chosen as a proxy. However, there a still space in future to choose a better proxy for Fintech. For example, invention in financial system can be used to measure Fintech. Bitcoin and crowdfunding are the best example of Fintech. However, since it is new to the economy it is hard to collect data regarding bitcoin and crowdfunding.

On top of that, during this research there are many counties were dropped due to insufficient of data. Future studies can adopt the whole OECD countries and longer time period which will increase the number of observations to get a precise result.

5.5 CONCLUDING REMARKS

This chapter summarize the empirical result that have been obtain from the empirical result. Besides that, this chapter also emphasize on policy recommendation based on the empirical findings. Lastly, this chapter is concluded with recommendation of future study.

REFERENCES

Al-IrianI, M. (2005). Energy–GDP relationship revisited: An example from GCC countries using panel causality. *Energy Policy*, 3342–3350.

King, R., & Levine, R. (1993). Finance and Growth: Schumpeter Might be Right. *The Quarterly Journal of Economics*, 717-737.

Li, Y., Spigt, R., & Swinkels, L. (2017). The impact of Fintech start-ups on. *Financial Innovation*, 3-26.

Madsen, J., Islam, M., & Doucouliagos, H. (2018). Inequality, financial development and economic growth in the OECD, 1870–2011. *European Economic Review*, 605–624.

Nyasha, S., & Odhiambo, N. (2015). The Impact of Banks and Stock Market Development on Economic Growth in South Africa: an ARDL-bounds Testing Approach. 93-108.

Ryu, H.-S. (2018). Understanding Benefit and Risk Framework of Fintech Adoption:Comparison of Early Adopters and Late Adopters. *Paper presented in Hawaii International Conference on System Sciences*.

Siddique, H. M., Usman, S., & Ishaq, J. (2018). Financial Development and Economic Growth: The Role of Energy Consumption. *Journal of Quantitative Methods*, 43-55.

Acaravci, S. K., Ozturk, I., & Acaravci, A. (2009). Financial development and economic growth:literature survey and empirical evidence from sub-Saharan

African countries. *South African Journal of Economic and Management Sciences*, 11-27.

Adeyeye, P. O., Fapetu, O., Aluko, O. A., & Migiro, S. O. (2015). Does Supply-Leading Hypothesis hold in a Developing Economy?A Nigerian Focus. *Procedia Economics and Finance 30*, 30 – 37.

Afonso, A., & Blanco-Arana, M. (2018). Financial Development and Economic Growth: A Study for OECD Countries in the context of Crisis. *REM Working Paper 046-2018*.

Arestis, P., Luintel, A., & Luintel, K. (2010). Financial structure and economic growth: evidence from time series analyses. *Applied Financial Economics*, 1479-1492.

Asteriou, D., & Spanos, K. (2018). The Relationship between Financial Development and Economic Growth during the recent Crisis: Evidence from the EU. *Accepted Manuscript Finance Research Letters*.

Best, A., & Francis, B. (2015). Is Financial Development Supply-leading or demand-following? Time-series Evidence from Barbados. *Carribbean Centre for Money and Finance Conference paper*.

Calderon, C., & Liu, L. (2003). The direction of causality between financial development and economic growth. *Journal of Development Economics*, 321 – 334.

Chow, G. (1993). Capital Formation and Economic Growth in China. *The Quarterly Journal of Economics*, 809–842.

Christiansen, H. (November, 2001). *Electronic Finance: Economics and Institutional Factors.* Retrieved from http://www.oecd.org/finance/financial-markets/2676135.pdf

Durusu-Ciftci , D., & Yetkiner, S. H. (2015). Financial Development and Economic Growth: Some Theory and More Evidence. *Accepted manuscript for Journal of Policy Modeling*.

Goldsmith, R. W. (1969). *Financial structure and development as a subject for international comparative study.* New Haven, CT: Yale University Press.

Gujarati, D. (2003). *Basic Econometrics.* New York: McGraw-Hill Higher Education.

Hossain, S. (2011). Panel estimation for CO2 emissions, energy consumption, economic growth,trade openness and urbanization of newly industrialized countries. *Energy Policy*, 6991–6999.

Huchet-Bourdon, M., Mouël, C. L., & Vijil, M. (2018). The relationship between trade openness andeconomic growth: Some new insights on theopenness measurement issue. *Wiley The world Ecomony ,* 59-76.

Kindleberger, C. (1978). *A History of financial Crisis.* Hoboken:Wiley.

Klein, M., & Olivei, G. (2008). Capital account liberalization, financial depth,and economic growth. *Journal of International Money and Finance*, 861–875.

Levine, R., & King, R. G. (1993). Finance and Growth: Schumpeter Might be Right. *The Quarterly Journal of Economics*, 717-737.

Madsen.J.B, I. a. (2018). Inequality, financial development and economic growth in the OECD, 1870–2011. *European Economic Review*, 605-624.

Masini, M. (1975). *Financial Deepening in Economic Development by EDWARD S. SHAW.* Giordano Dell-Amore Foundation.

Masoud, N., & Hardaker, G. (2012). The impact of financial development on economic growth:Empirical analysis of emerging market countries. *Studies in Economics and Finance*, 148-173.

McKinnon, R. (1974). Money and Capital in Economic Development. *The American Political Science Review*, 1822-1824.

Menyah.K. (2007). Financial Development,Trade openness and economic growth in african countries. *Economic Modelling*, 386-394.

Mirchandani, A. (Vol. 3, No. 1, 2013). Analysis of Macroeconomic Determinants of. *International Journal of Economics and Financial Issues*, 172-179.

Murinde, V., & Eng, F. (1994). Financial development and economic growth in Singapore: demand-following or supply-leading? *Applied Financial Economics*, 391-404.

Nyasha, S., & Odhiambo, N. (2015). Economic growth and market-based financial systems: a review. *Studies in Economics and Finance*, 235-255.

Odhiambo, N. M. (2007). *Supply-leading versus Demand-following Hypothesis: Empirical Evidence from Three SSA Countries.* Published by Blackwell Publishing Ltd.

Rafiq, S., & Salim, R. (2011). The linkage between energy consumption and income in six emerging economies of Asia An empirical analysis. *International Journal of Emerging Markets*, 50-73.

Raihan, A. (2001). The State of E-Finance in Developing Countries: Bangladesh Perspective. *Improving Competitiveness of SMEs in Developing Countries: Role of Finance, including E-finance to Enhance EnterpriseDevelopment.* Bangladesh.

Sehrawat, M., & Giri, A. (2015). The role of financial development in economic growth: empirical evidence from Indian states. *International Journal of Emerging Markets*, 765-780.

Shamim, F. (2007). The ICT environment, financial sector and economic growth: a cross-country analysis. *Journal of Economic Studies*, 352-370.

Stewart, H., & Jürjens, J. (2018). Data security and consumer trust in Fintech innovation in Germany. *Information & Computer Security*, 109-128.

APPENDIX

LIST OF COUNTRIES

1 Austria

2 Canada

3 Chile

4 Czech Republic

5 Denmark

6 Estonia

7 Finland

8 France

9 Germany

10 Greece

11 Hungary

12 Ireland

13 Italy

14 Japan

15 Luxembourg

16 Mexico

17 Netherlands

18 Norway

19 Portugal

20 Slovak Republic

21 Spain

22 Turkey

23 United Kingdom

24 United States